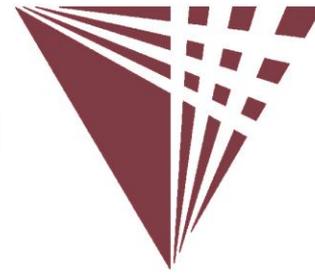


IPRO 319 Warehouse Logistics Tool



FINAL REPORT



Instructor: Herb Shields

Sponsor: Warehouse Education and Research Council & The Kern Family Foundation

Team: Khanh Duong
Uchenna Egwu
Justin Ma
Arthur Mcanally
Kristin Mrozinski
Douglas Oh
Nickolay Schwarz
Sarah Stone
Aleksandar Sudar
Arthur Zavala



Milestones

- 1 Project planning phase**
 - Identify Objectives
 - Task Division
 - Create Project Plan 02-16**
 - 2 Research Phase**
 - Library Research
 - WERC Research –web
 - Interview Industry Workers
 - Create Midterm Deliverables 03-23**
 - 3 Division into Sub-teams**
 - Programming
 - RFI/RFP Development
 - FAQ Team
 - Create Final IPRO Deliverables 04-25**
 - 4 Presentations**
-

Semester Problem

Problem

- Help companies deal with cost analysis through a web-based tool
- Provide assistance to companies seeking to outsource logistics operations
- Provide web-based RFI/RFP tools for use with the program

Objectives

- Finalize and enhance model for use on WERC website
 - Develop instructions (FAQ) for helping users of the model
 - Develop an outsourcing and pricing tool within the model
-

Research Phase

- Library and Online Journal Research
 - Materials Handling Management Journal
 - Logistics Management Journal
 - WERC website resources

 - Interviews with Professionals
 - Bob Shaunessey from WERC / **February 13**
 - Financial issues and Warehouse costs
 - Strive Group / **March 23**
 - Warehouse Operations and Activities
 - Financials
 - Barb Franch from Sears / **March 6**
 - Information about warehouse operations
 - Helpful to RFI/RFP development

 - Research the layout and programming of the WERC website's source code
-

Initial Task Division

Overall Team Assignments

- No sub-teams for project planning and research phases

Nickolay Schwartz
Team Leader



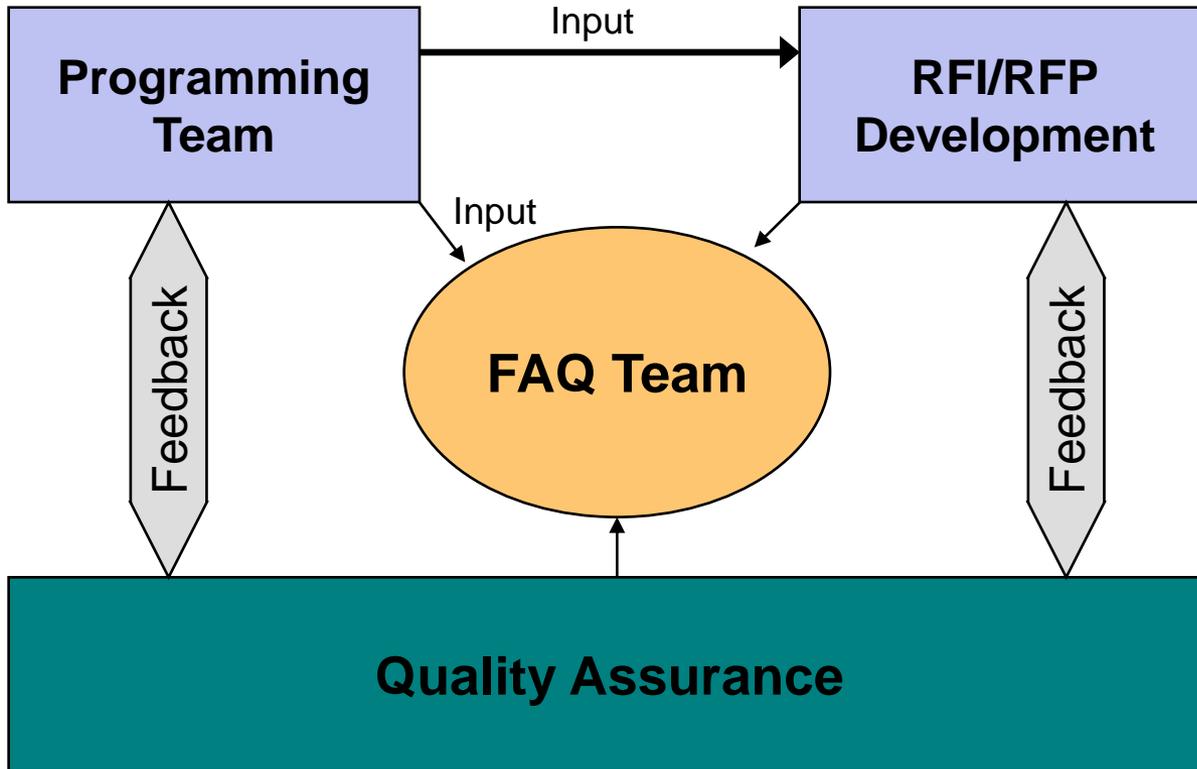
Aleksandar Sudar
Assistant Team Leader



Sarah Stone
Secretary



Division into Sub-teams



Excel Model

- **Objective:** to create a model for the development team to utilize in their web tool for calculating **warehouse efficiency** and **benchmarking**

Research Contributions:

- Defined input and output variables
- Formulated calculations
- Defined basic model structure for generating outputs
- Implement output parameters of other companies for comparison

Our Primary Focus:

- Building and Equipment
- Labor, Maintenance, Utilities
- Output Results and Benchmarking

FAQ/Instructions Sub-Team

- The FAQ team developed an instruction manual for the model, which will be available to be developed into an instruction manual for the program.

Sarah Stone
Sub-team leader



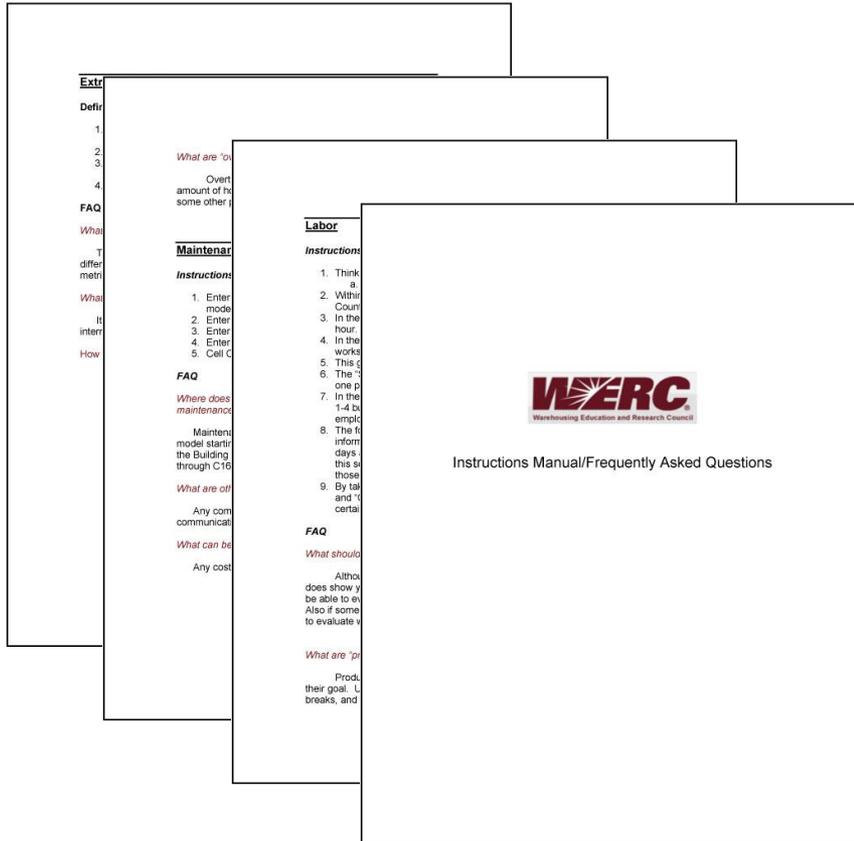
Kristin Mrozinski



Douglas Oh



FAQ/Instructions Sub-Team



- Frequently Asked Questions...
 - Instructions for the model
 - Definitions of key terms
 - Questions that the user might have
- Continuously updated through website feedback

Programming Sub-Team

- Team is responsible for the development of cost based (DC operational cost model) online tool to provide users with easy step-by-step program that will analyze their data and will assist in decision-making process.

Nickolay Schwarz
Sub-team leader



Khanh Duong
Design and backend
development



Arthur Mcanally
Design and backend
development

Programming Sub-Team

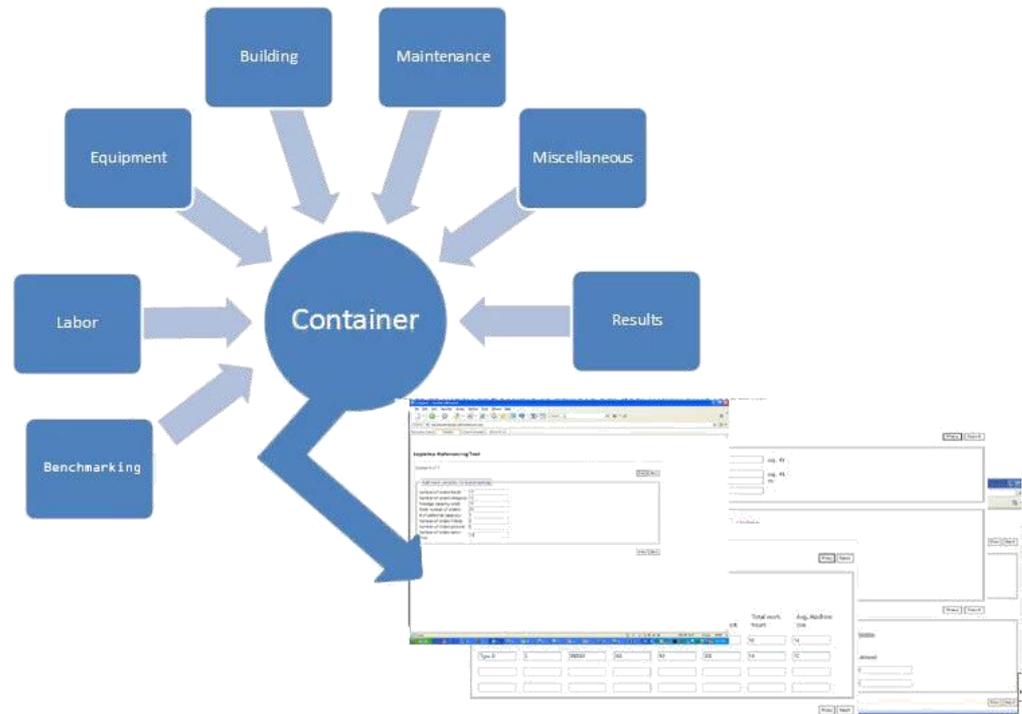
Data structure for each page of the tool:

- **Building**
- **Labor**
- **Equipment**
- **Maintenance**
- **Miscellaneous**
- **Benchmarking**
- **Results**

Each structure is contained in a wrapper object called **“Container”**.

User-end web application is driven by **“Container,”** holds the user’s data and performs necessary calculations

Saves information as **“Sessions”**



Programming Sub-Team

- Tool created on Internet Information Services (IIS) server
- Written in C# .NET with combinations with .asp technologies

```

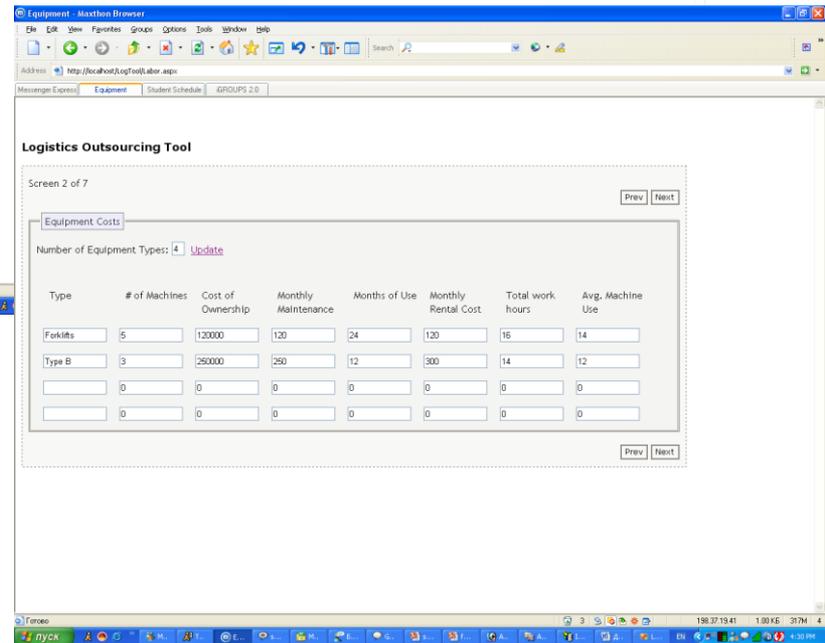
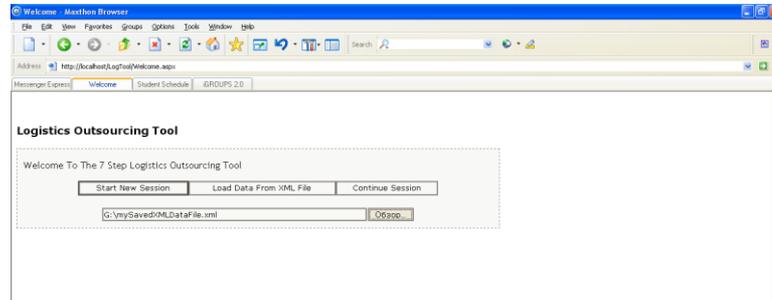
private void makeCalculation()
{
    palletAreaFloor = (BuildingSpace * palletPack) / palletSize;
    capacity = (palletAreaFloor * boxWeight) / (palletWeight * boxWeight);
    costPerPack = getCost();
}

public double getCapacity()
{
    return capacity;
}

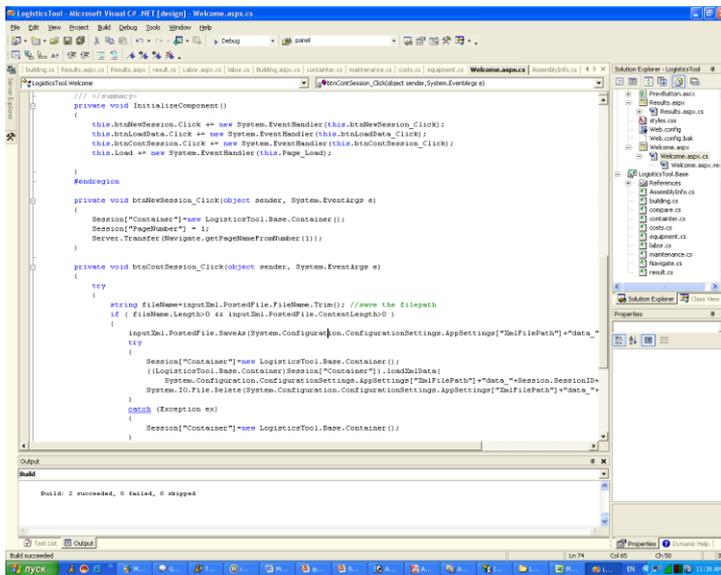
public void addMailData(MailDocument doc)
{
    MailElement element = doc.CreateElement("Building");
    element.SetAttribute("BuildingSpace", BuildingSpace.ToString());
    element.SetAttribute("PalletPack", palletPack.ToString());
    element.SetAttribute("PalletSize", palletSize.ToString());
    element.SetAttribute("BoxWeight", boxWeight.ToString());
    element.SetAttribute("BoxWeightConv", boxWeightConv.ToString());
    doc.DocumentElement.AppendChild(element);
}

public void loadMailData(MailAttributeCollection attrs)
{
    try
    {
        BuildingSpace = Convert.ToDouble(attrs.GetNamedItem("BuildingSpace").Value);
        palletPack = Convert.ToDouble(attrs.GetNamedItem("PalletPack").Value);
        palletSize = Convert.ToDouble(attrs.GetNamedItem("PalletSize").Value);
        boxWeight = Convert.ToDouble(attrs.GetNamedItem("BoxWeight").Value);
        boxWeightConv = Convert.ToDouble(attrs.GetNamedItem("BoxWeightConv").Value);
    }
    catch (Exception e)
    {
        // Handle exception
    }
    makeCalculation();
}

```



Programming Sub-Team



- Each component is split into 3 files:
 - “.cs” which uses the templates of the container
 - “.aspx” which sets up the actual webpage layout
 - “.aspx.cs” which loads and stores the files from the Excel model

Programming Sub-Team

- Simple to use tool
- Comparison to market values (provided by WERC) and used to help calculate efficiency

The screenshot displays a web browser window with the following content:

Screen 7 of 7

[Save Session Data](#) [Prev](#)

Results

Your total usable building capacity is 144250sqFt.

Cost	% of Total Cost	Cost Amount
Building	4.77 %	\$1,250.00
Labor	68.71 %	\$18,000.00
Equipment	22.32 %	\$5,845.83
Maintenance	3.63 %	\$950.00
Miscellaneous	0.57 %	\$150.00
Total	100%	\$26,195.83
Cost per pallet	5	0.18

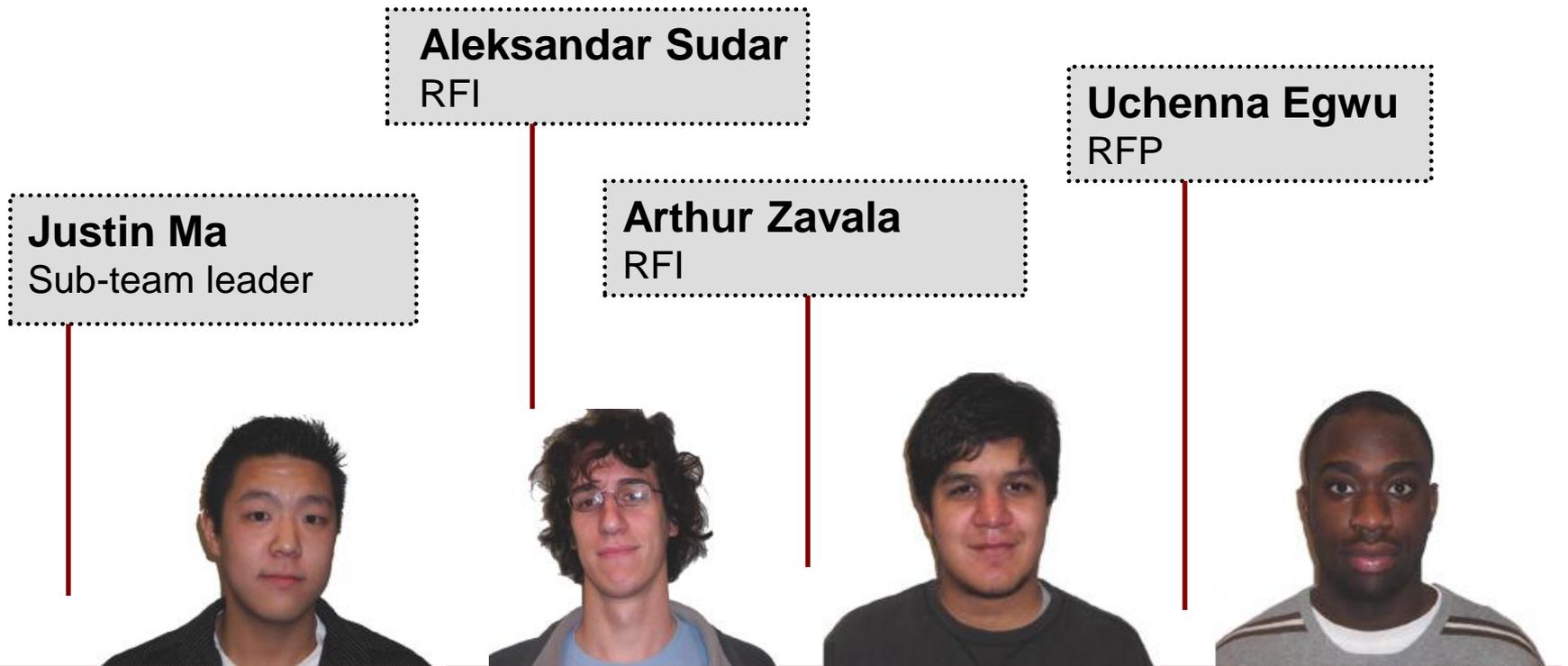
Benchmarking

Comparing current values:

Key metrics	Value	Low	Average or Median	High	Best in class	Actual median
Order fill rate, %	93.0	97.5	99.0	N/A	94.1	
Employees productivity vs standard	81-89.9	89.6-96.8	96.8-108.1	>108.1	95	
Productive hours to total hours	75-84	84-88	88-95	>95	85.8	

RFI/RFP Development Sub-Team

- The team developed the web version of the request for information form and the request for proposal form.



RFI/RFP Development Sub-Team

Request For Proposal		WERC <small>Washington Educational and Resource Council</small>	
<i>Date:</i>			
<i>To:</i>		<i>From:</i>	
<i>City:</i>		<i>Work History</i>	
<i>Phone Number:</i>		<i>Experience</i>	
<i>RFP Acct. No. Pages:</i>		<i>Reference's</i>	
<i>CC:</i>		<i>Proposed Guidelines & Requirements</i>	
<i>Send Response To:</i>		<i>Send Via:</i>	
<i>Send Response by:</i>		<i>Contract Terms and Conditions</i>	
<i>Evaluation Criteria</i>		<i>Budget</i>	
<i>Timeline</i>		<i>Scope And Guidelines</i>	

RFP

- RFP's are sent out to perspective companies to evaluate the benefits of outsourcing
- Construct a tool that would allow warehouses to easily create a RFP Form
- Allow for multiple fields of data to accommodate most RFP requests
- Capable of both electronic and hard copy formats
- Fully integrated into the warehouse logistics tool

RFI/RFP Development Sub-Team

Request For Proposal MASTER			
<i>Date:</i>		<i>Send Response by:</i>	
2/28/2007		3/2/2007	
<i>To: Company A</i>		<i>To: Company B</i>	
Nike Shoe Company		Adidas Shoe's	
123 Run Fast Avenue		123 S. Ball DR.	
Nikeville, OR 23452		Omaha, NE 68157	
<i>C/O:</i>			
Michael Jordan			
<i>Phone Number:</i>	<i>Pages:</i>	<i>Phone Number:</i>	<i>Pages:</i>
(123) 456-789		(123) 952-654	
<i>RFP Acct:</i>		<i>RFP Acct:</i>	
75kd456		75kd457	
<i>CC:</i>		<i>CC:</i>	
Adidas 123 S. Ball Dr. Omaha, NE 68157		Nike Shoe Co. 123 Run Fast Ave. Nikeville, OR 23452	
Puma 456 Puma Circle Lexington, KY 87653		Puma 456 Puma Circle Lexington, KY 87653	
Reebok 789 Tennis Av. Madison, VI 45321		Reebok 789 Tennis Av. Madison, VI 45321	
<i>RFP Proposal</i>		<i>RFP Proposal</i>	
Click to go to attached form		Click to go to attached form	
<i>To: Company C</i>		<i>To: Company D</i>	
Puma Footwear		Reebok Kicks	
456 Puma Cr.		789 Tennis Av.	
Lexington, KY 87653		Madison, VI 45321	
<i>C/O:</i>		<i>C/O:</i>	
<i>Phone Number:</i>	<i>Pages:</i>	<i>Phone Number:</i>	<i>Pages:</i>
(123) 952-654		(123) 952-654	
<i>RFP Acct:</i>		<i>RFP Acct:</i>	
75kd458		75kd459	
<i>CC:</i>		<i>CC:</i>	
Adidas 123 S. Ball Dr. Omaha, NE 68157		Adidas 123 S. Ball Dr. Omaha, NE 68157	
Nike Shoe Co. 123 Run Fast Ave. Nikeville, OR 23452		Puma 456 Puma Circle Lexington, KY 87653	
Reebok 789 Tennis Av. Madison, VI 45321		Nike Shoe Co. 123 Run Fast Ave. Nikeville, OR 23452	

RFP Master Form

- Create an “At A Glance” table for the key elements of the returned RFP’s
- Added convenience for warehouse operators, allowing easy review of data
- Enhancing the flexibility of the model

RFI/RFP Development Sub-Team

RFI-RFP Section

Instructions

Open the RFI/RFP by clicking the "RFP/RFP" button in the program. Begin by filling out the subtitled boxes.

Current filled in data serves as examples only

- : When the form was issued
- : When the form response is due
- : Contact phone number
- : Number of pages in the form to ensure the company receives the whole form
- : The account number used by the warehouse
- : This field is used for clarification on subjects not expressly stated in the RFI/RFP form
- Click save/print/submit when finished

Request for information

Date: MM/DD/YYYY

To: Nike Shoe Company
123 Run Fast Avenue
Nikeville, Oregon

From: IPRO 319 Co.
3300 S. Federal St.
Chicago, Illinois

C/O: Michael Jordan

Phone: (123) 456-7890

RFI Acct: 7584856 # Pages: 1

CC: Adidas 123 S. Ball Dr. Omaha, NE 68157
Puma 456 Puma Circle Lexington, KY 40503
Reebok 789 Tennis Av. Baltimore, MD 43011

Send response to: IPRO 319
2431 S. Wabash
Chicago, IL 60614
C/O Saaba Dastar

Send via: Mail Delivery

Send response by: 6/21/2007

Question 1:
Brief history of your company, including how long you have been in service as well as what sports do specialize in. Also include the different amount apparel you sell.

Response:

Question 2:
Please list the names of athletes that endorse your shoes/apparel. Also include the name of the shoe for each athlete, if possible.

Response:

To create RFI on separate page for printing click submit

Instructions for accessing and using the RFI/RFP form

Source: MERC Server

- Download the RFI form, hyperlink, and fill in all the pertinent fields.
- Save file, print, and send to prospective companies.
- After narrowing down the prospective companies, download the RFP form, hyperlink, and fill in all the fields deemed necessary.
- Save file, print, and send to prospective companies.

Source: Excel!

This is primarily used when electronic methods of communication are preferred.

- Download the RFI form, hyperlink, and fill in all the pertinent fields.
- Save file, and email to prospective companies.
- After narrowing down the prospective companies, download the RFP form from hyperlink and fill in all the fields deemed necessary.
- Save file and Email to prospective companies.

Request for Proposal Form

Date: _____

To: _____ From: _____

C/O: _____

Phone: _____

RFI Acct: _____ # Pages: _____

CC: _____

Send response to: _____ Send via: _____
Send response by: _____

Work history: _____ Contract terms and conditions: _____

Experience: _____ Timeline: _____

Reference: _____ Budget: _____

Proposed guidelines and requirements: Scope and Guidelines: _____

Evaluation criteria: _____

To create RFP on separate page for printing click submit

• When the responses arrive, the model will then allow you to view the Master RFP.

• This form contains all the critical information from all the prospective companies on a single sheet, allowing the user to easily compare and contrast the different petitions.

Example of the Master Form for 2 Companies

Company 1		Company 2	
Date:	Send by:	Date:	Send by:
To:	C/O:	To:	C/O:
Phone Number:	Pages:	Phone Number:	Pages:
RFI Acct:		RFI Acct:	
CC:		CC:	
RFP Proposal <input type="button" value="Complete"/> <input type="button" value="Reset"/>			

downloads:

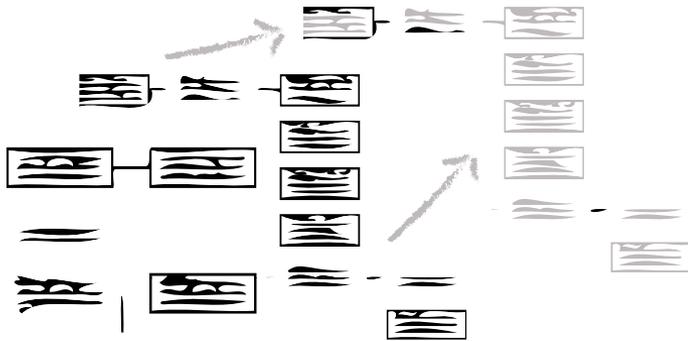
- [Request For Information Form](#)
- [Request For Proposal Form](#)
- [Request For Proposal Master Form](#)

Web Example

- A visualization of the RFI/RFP
- Could be used for implementation of the model
- Come with examples and instructions, links to Excel sheets

Barriers, & Obstacles - A Learning Process

Project Management



- Assign the work early and evenly
- Communicate between the team
- Make sure the project team is on task
- Review the status of the group at each step and revise tasks as needed
- Manage changes in the project and adjust the end goal if needed

Barriers, & Obstacles - A Learning Process

Ethics

- Communicate and build trust
 - Speak with respect
 - Accept other team members and each person's role
 - Consider problems in cross-cultural communication
 - Non-verbal communication is very important
-

Barriers, & Obstacles - A Learning Process

Teamwork

- Take some time to build a team with patience
 - Establish rules for team behavior in one of the first meetings
 - Make an effort to be a team member
 - Accept the role of each team member
 - Find ways to create early success in each sub-team and for the whole IPRO team
-

Questions and Answers

Thank you for your time and attention.

If you have any questions we will direct you to the appropriate team member.

Please provide the us with any feedback you may have to improve our project.
